10/075936

Claims:

1. A planar-magnetic transducer comprising:

at least one thin film vibratable diaphragm with a first surface side and a second surface side, including a predetermined active region, said predetermined active region including a predetermined conductive surface area for converting an input electrical signal into a corresponding acoustic output ;

primary magnetic structure including at least three elongated magnets placed adjacent and substantially parallel to each other with said magnets being of high energy and each having an energy product of greater than 25 mega Gauss Oersteds which results in strong interaction between adjacent magnets; and

a mounting support structure coupled to the primary magnetic structure and the diaphragm to capture the diaphragm, hold it in a predetermined state of tension and space it at predetermined distancing the primary magnetic structure adjacent one of the surface sides of the diaphragm;

said conductive surface area including elongate conductive paths running substantially in parallel with said magnets;

the mounting support structure, the at least three magnets of the primary magnetic structure, and the diaphragm having coordinated compositions and being cooperatively configured and positioned in predetermined spaced apart relationships wherein (i) the mounting support structure stabilizes the diaphragm in a static configuration at the predetermined tension which remains stable over and between extended periods of use, despite occurrence of dynamic conditions in response to extreme high energy forces driving the diaphragm to audio output, and (ii) the high energy magnetic forces interacting between the at least three magnets do not interfere with the predetermined tension of the diaphragm;

at least one secondary magnet structure positioned adjacent to the opposite surface of said thin film diaphragm from the primary magnet structure and spaced a predetermined distance from said diaphragm;

said secondary magnet structure having fewer magnets than said primary magnet structure,

said planar-magnetic transducer being operable as an enhanced single ended transducer.

2. The planar-magnetic transducer of 1 wherein said secondary magnetic structure is less than 60 percent of the magnets of the primary magnetic structure.

3. The planar-magnetic transducer of 1 wherein said secondary magnetic structure is less than 40 percent of the magnets of the primary magnetic structure.

4. The planar-magnetic transducer of 1 wherein said secondary magnetic structure is no more than 20 percent of the magnets of the primary magnetic structure.

5. The planar-magnetic transducer of 1 wherein said secondary magnetic structure has one row of magnets centered in a side to side relationship on the planar-magnetic transducer.

6. The planar-magnetic transducer of 1 wherein said primary magnetic structure is the backside of the transducer and the secondary magnetic structure is the front of the transducer optimized to be oriented toward the listening position.

7. The planar-magnetic transducer of 1 wherein said primary magnet structure has five adjacent rows of magnets and said secondary magnet structure has three adjacent rows of magnets.

8. The planar-magnetic transducer of 1 wherein said primary magnet structure has five adjacent rows of magnets and said secondary magnet structure has one central row of magnets.

9. The planar-magnetic transducer of 1 wherein said secondary magnetic structure comprises high energy neodymium magnets.

10. The planar-magnetic transducer of 6 wherein said secondary magnetic structure comprises high energy neodymium magnets.

11

~~16~~. A planar-magnetic transducer comprising:

Rule 126

at least one thin film vibratable diaphragm with a first surface side and a second surface side, including a predetermined active region, said predetermined active region including a predetermined conductive surface area for converting an input electrical signal into a corresponding acoustic output;

primary magnetic structure including at least three elongated magnets placed adjacent and substantially parallel to each other with at least one of said magnets being of high energy with each having an energy product of greater than 25 mega Gauss Oersteds; and

a mounting support structure coupled to the primary magnetic structure and the diaphragm to capture the diaphragm, hold it in a predetermined state of tension and space it at predetermined distancing from the primary magnetic structure adjacent one surface side of the film diaphragm;

said conductive surface area including elongate conductive paths running substantially in parallel with said magnets;

any of the at least three adjacent magnets being oriented to be of opposite polarity orientation in relation to an adjacent magnet;

said primary magnetic structure having at least three adjacent rows of side by side magnets with at least an outer two rows of the at least three rows of magnets providing less magnetic field strength through the conductive surface area of the diaphragm than provided through the conductive surface areas of the diaphragm by a center row of the magnets;

said planar-magnetic transducer operating as a single ended planar-magnetic transducer.

12

~~17~~. The planar-magnetic transducer of ~~16~~ 11 including at least five adjacent rows of magnets with at least two outer rows of said five rows of magnets providing less magnetic field strength through the conductive surface area of the diaphragm than provided through the conductive surface area of the diaphragm by a center row of magnets.

13

~~18~~. The planar-magnetic transducer of ~~16~~ 11 wherein the primary magnetic structure includes neodymium magnets with an energy rating of at least 34 mGO.

14

~~19~~. The planar-magnetic transducer of 11 ~~16~~ wherein:

said diaphragm has a central region and remote regions that are a distance away from said central region,

said primary magnetic structure has central region magnets and adjacent remote magnets that are spaced away from said central region magnets,

the predetermined spaced apart relationship of the diaphragm from the magnets of the primary magnetic structure being greater at a central region of the diaphragm over at least one central magnet than at the remote regions over at least one remote magnet.

15

~~20~~. The planar-magnetic transducer of 11 ~~16~~, further comprising:

at least one secondary magnet structure positioned adjacent to the opposite surface of said thin film diaphragm from the primary magnet structure and spaced a predetermined distance from said diaphragm;

said secondary magnet structure having fewer magnets than said primary magnet structure.

16

~~21~~. The planar-magnetic transducer of 15 ~~20~~ wherein said secondary magnetic structure is less than 60 percent of the magnets of the primary magnetic structure.

17

~~22~~. The planar-magnetic transducer of 20 wherein said secondary magnetic structure is less than approximately 40 percent of the magnets of the primary magnetic structure.

18

~~23~~. The planar-magnetic transducer of 15 ~~20~~ wherein said secondary magnetic structure is no more than 20 percent of the magnets of the primary magnetic structure.

19

~~24~~. The planar-magnetic transducer of 15 ~~20~~ wherein said secondary magnetic structure one row of magnets centered in a side to side relationship on the planar-magnetic transducer.

11

20 ~~25~~. The planar-magnetic transducer of ~~16~~ wherein,

said diaphragm has a central region and remote regions that are a distance away from said central region,

said primary magnetic structure has central region magnets and adjacent remote magnets that are spaced away from said central region magnets,

said diaphragm and the predetermined spaced apart relationship from the magnets of the primary magnetic structure are spaced such that the spaced apart relationship is greater at a central region of the diaphragm over at least one central magnet than the remote diaphragm regions over at least one remote magnet.

21 ~~26~~. A planar-magnetic transducer which includes:

a vibratable diaphragm and attached conducive area capable of interacting with a magnetic field to convert and audio signal to acoustic output from the diaphragm;

an arrangement of primary magnetic structure positioned proximate to one side of the diaphragm for providing a desired magnetic field; and

at least one (but fewer that the all magnets comprising the primary magnetic structure) secondary magnet positioned on an opposing side of the diaphragm in a position which enhances acoustic output of the diaphragm.

22 ~~27~~. A transducer as in 21 ~~26~~, further comprising at least one virtual magnetic structure positioned adjacent the secondary magnet and operable to further enhance the audio output of the transducer.